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(71) Applicant

Aktiebolaget Overums Bruk (Sweden),  
Box 100, S-590 96 Overum, Sweden

(72) Inventor

Jyrki Pellervo Heikkilä

(74) Agent and/or address for service

Withers & Rogers, 4 Dyer's Buildings, Holborn, London  
EC1N 2JT

(54) Plough

(57) A plough comprises a frame (10) and several plough beams (11) pivoted to the frame, each plough beam being provided with at least one plough body for cultivating the ground. The frame is coupled by a drawbar (12) to a linkage (13) which can be connected to a towing vehicle. A means (18) for transmitting movement between the linkage (13) and the frame (10) is acted on partly by a first adjustment means (20) for parallel movement of the frame (10) at the same time as the plough bodies are moved in parallel to adjust the position of the first ridge and, partly by a second adjustment mechanism (22) to change the working width of the plough while maintaining the direction of the plough bodies.

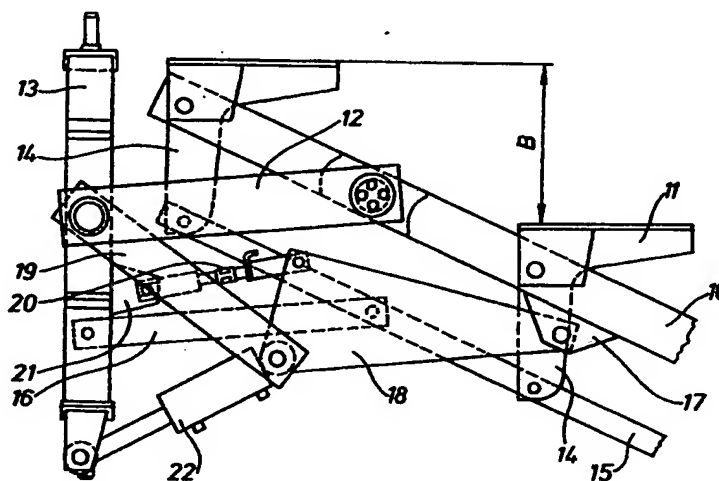


Fig.1

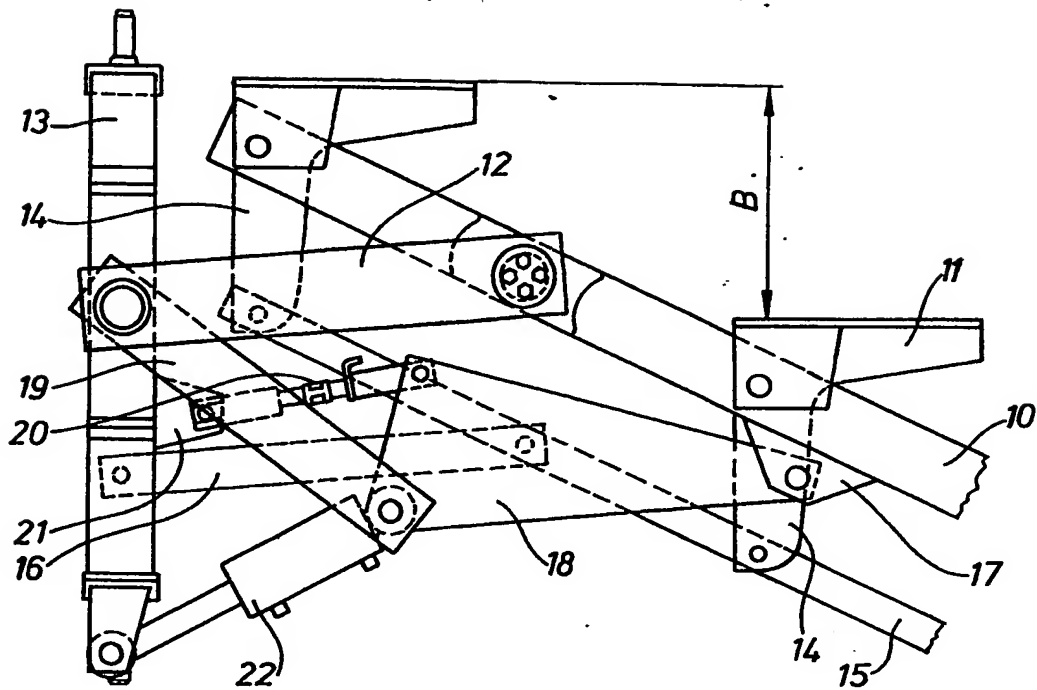


Fig. 1

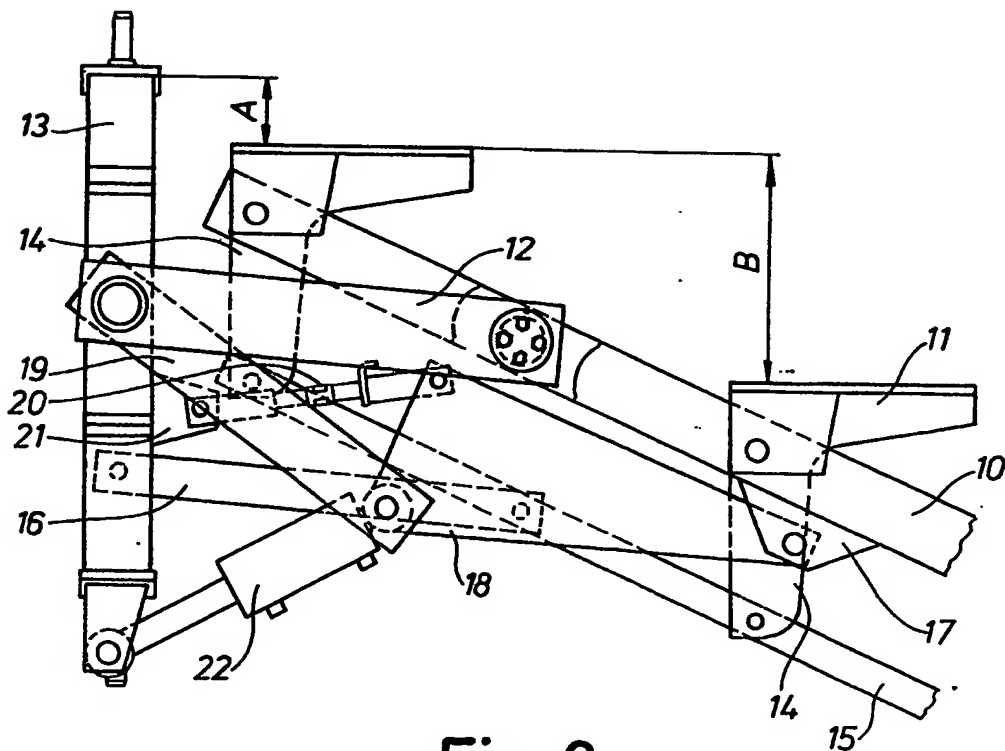


Fig. 2

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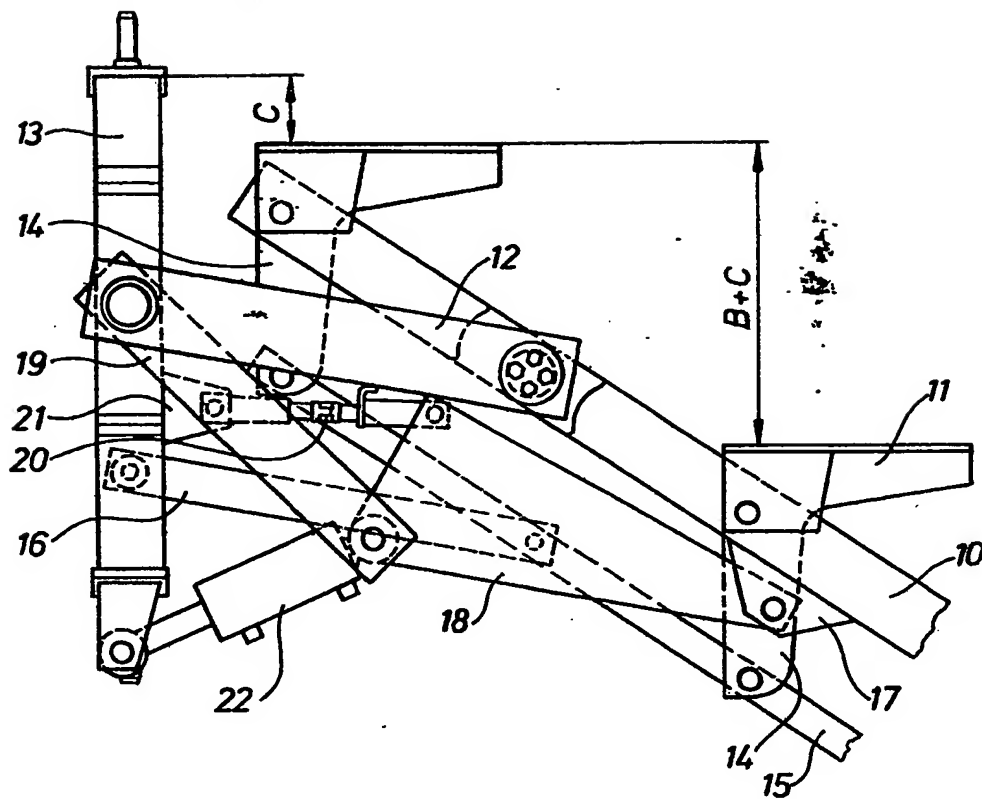


Fig. 3

## SPECIFICATION

## Plough

This invention relates to a plough comprising  
5 several plough beams pivoted to a frame, each  
plough beam being provided with at least one  
plough body for cultivating the ground, the frame  
being coupled by a drawbar to a linkage which is  
connected to a towing vehicle.

10 Ploughs with possibilities to adjust the working  
width by changing the width of all the ridges  
simultaneously and to adjust the position of the  
plough sideways for fitting the distance between the  
wheels of the towing vehicle or with respect to  
15 occasional inclinations sideways are previously  
known for instance by EP 62 734 and Norwegian  
Patent 149 906.

The first mentioned publication shows a plough in  
which adjustment of the width is made by means of  
20 hydraulic cylinder and by maintaining the set  
direction of the plough bodies the plough bodies  
being directed by means of a stay which is parallel  
to the frame and to which all plough beams are  
turnably connected. For adjusting the position of the  
25 first ridge a separate screw-guide arrangement is  
used by means of which the complete plough frame  
can be moved parallel sideways. This solution can  
however only be used in such trailer ploughs where  
the fastening point of the first body in the frame has  
30 the same distance from the pivot point of the frame  
as the fastening points of the plough bodies have  
from each other. This means that the center of  
gravity will be placed comparatively far at the back  
of the plough which is negative from each point of  
35 view. In particular this is the case with ploughs  
having safety release arrangements. Another  
drawback with the solution is that the suggested  
guide arrangement is expensive to manufacture  
because of the high requirements precision and  
40 accuracy of finish.

What has been said above means that an  
arrangement of the kind referred to above has its  
limitation with respect to heavy, trailed ploughs i.e.  
reversible ploughs or such ploughs which are  
45 provided with release means. In order to make it  
possible to use ploughs with for instance 3—5  
shares in such connections it is necessary that the  
point of gravity is placed as far at the front as  
possible i.e. that the first plough body is placed as  
50 near as possible with respect to the fastening point  
of the plough in the towing vehicle. Also very short  
movements of the gravity point could in this  
connection be critical for the function of the device.

The Norwegian patent publication 149 906 shows  
55 a semiconducted plough with a frame which via a  
drawbar is fastened to the linkage, several plough  
bodies being placed in front of as well as behind the  
fastening point. When adjusting the width of the  
plough also here the direction of the plough is  
60 maintained by means of a parallel stay. Moreover  
the plough is provided with an adjustment means  
for the position of the first ridge, this means for  
obvious reason being designed without any  
thoughts about the position of the gravity point.  
65 Thus, a movement of the front part of the frame

towards the part of the field which has been  
ploughed means that the first plough body swings  
rearwards which means that the gravity point  
comes unnecessarily far back.

70 The plough according to the invention is so  
designed that the width and position with respect to  
the towing vehicle can be adjusted by means of the  
same interconnected adjustment means, the point  
of gravity always being placed as far ahead as  
75 possible independent of the width of the plough, or  
the position of the first ridge. Adjustment is by  
means of a mechanism which is simple and robust  
and hence cheap in production. This is achieved by  
a device according to invention as defined in the  
80 following claims.

An embodiment of the invention will now be  
described with reference to the accompanying  
drawings, in which Figure 1 is a plan view of a  
device according to the invention, Figure 2 is a  
85 similar view to Figure 1 where the first ridge has  
been adjusted and Figure 3 is a similar view with  
another setting of the width.

As appears from the figures, the device comprises  
a plough frame 10 with several ploughbeams 11  
90 which are pivoted to the frame. The plough beams  
each support a plough body (not shown) or, in the  
case of reversible ploughs, two plough bodies, and  
can be provided with a release arrangement which,  
on running into rigid obstacles in the ground, allows  
95 the plough body to be lifted out of the ground and  
then lowered again.

The frame 10 is coupled by a drawbar 12 to a  
linkage 13 which is intended to be fastened in a  
towing vehicle (not shown) by means of a  
100 conventional threepoint linkage. Each plough  
beams has a bracket 14 by means of which the  
inclination of the plough beam to the frame can be  
adjusted. These brackets are also pivoted to a stay  
15 which is parallel to the frame. A first link arm 16  
which is pivoted at one end to the linkage, and at the  
other to the stay. Further the frame is provided with  
a lug 17 to which a means 18 for transmitting  
movements is turnably secured. This means is  
105 shaped as a triangular plate which via a second link  
arm 19 is connected to the linkage. The means for  
transmitting the movement is also pivoted, via a  
first adjustment mechanism 20 in the form of a  
screw, to a lug 21 on the linkage. A second  
adjustment mechanism 22 is connected between  
115 the pivot of the second link arm 19 in the movement  
transmitting means 18 and the linkage 13.

Adjustment of the first ridge is made by setting  
the first adjustment mechanism 20. If the  
adjustment mechanism is extended, this means that  
the means 18 for transmitting the movement will  
120 turn clockwise about the connecting point between  
the second link arm 19, the second adjustment  
mechanism 22 and the means 18 for transmitting  
the movement. This in turn means that the  
connecting point between the means 18 for  
transmitting the movement and the frame 10 will be  
125 moved downwards in Figure 1. Because the  
drawbar 12, the second link arm 19, the means 18 for  
transmitting movement, and the frame 10 together  
form a parallelogram the complete frame will be  
130

moved parallel downwards in the figure. During this movement the first linkarm 16 will swing clockwise about its fastening point in the linkage the connecting point between the stay 15 and the first linkarm 16 mainly being moved vertically downwards in the figures thereby maintaining the direction of the plough beams 11. Thus, this means that the setting of the first ridge with respect to the linkage changes the distance A at the same time as the width B of the ridges is maintained.

The second adjustment mechanism 22 operates as follows:

Supposing that the length of the adjustment mechanism is reduced. The second link arm 19 in the parallelogram which is formed by said linkarm, drawbar 12, frame 10 and means 18 for transmitting movement is then swung clockwise about its fastening point to the linkage 13 causing a corresponding change of angle of the frame 10, which means that the working width of the plough increases. Adjustment is made at the same time as the first ridge is moved the distance C, which means that distance between two successive plough bodies is increased with this distance. The direction of the plough bodies is maintained, as is described above, by means of the first link arm and the stay.

#### CLAIMS

1. Plough comprising a frame, and a plurality of plough beams pivoted to the frame, each plough beam being provided with at least one plough body for cultivating the ground, the frame being coupled by a drawbar to a linkage which is connected to a towing vehicle, characterized in that a means (18) for transmitting movement is placed between the linkage (13) and the frame (10), the means for

transmitting movement being acted on partly by a first adjustment mechanism (20) for moving the frame (10) parallel to itself, the plough bodies being kept parallel to each other, and partly by a second adjustment mechanism (22) so as to change the working width of the plough while maintaining the direction of the plough bodies.

2. Plough according to Claim 1, characterized in that each plough beam (11) has a bracket (14) which is connected to a stay (15) which is parallel to the frame and which via a first link arm (16) is connected to the linkage (13) for turning the plough bodies simultaneously with respect to the frame.

3. Plough according to Claim 1 or 2, characterized in that the means (18) for transmitting movement is pivoted to one end of a second link arm (19) the other end of which is pivoted to the linkage (13).

4. Plough according to Claim 1—3, characterized in that the points at which the means (18) for transmitting the movement is pivoted to the first and second adjustment mechanisms (20, 22) and a plough frame (10) respectively form a triangle.

5. Plough according to Claim 3 or 4, characterized in that the fastening points of the second linkarm (19) and the second adjustment mechanism (22) at the means (18) for transmitting the movement are placed on the same vertical axis.

6. Plough according to any preceding claim, characterized in that the plough means (11) are provided with release mechanisms.

7. Plough according to any preceding claim, characterized in that the first adjustment mechanism (20) comprises a screw whereas the second adjustment mechanism (22) is a hydraulic cylinder.